

ON SOME CAVERNICOLOUS ORTHOPTERA AND DERMAPTERA FROM ASSAM AND BURMA.

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(Plates IV, V.)

Thanks to Dr. N. Annandale and his collaborators I have had the opportunity of working out a third series of Indian cavernicolous Orthoptera and Dermaptera¹. This series is chiefly composed of collections made by Dr. S. Kemp and Mr. B. Chopra in the Siju Cave (Garo Hills), to which a few species from Lakadong Cave (Jaintia Hills), collected by Mr. R. Friel, have been added and also several obtained by Dr. Annandale in a cave in the Southern Shan States of Burma.

The study of this collection has proved most interesting; not only are 6 of the 10 species new, but 4 of them show distinctive features of such importance as to form the types of new genera. But still more interesting is the fact that two of these species belong to groups which, till now, had showed no truly cavernicolous representatives. Such is theese with a remarkable Nemobiid and with an earwig belonging to the gnus *Forcipula*. If the latter does not show very distinct characters of adaptation to cavernicolous life, save the absence of wings and a pubescence more abundant than usual, the former² is remarkably decolourized and shows clearly the influence of cavernicolous life in a group in which, as stated above, it had not yet been detected.

Lastly I would lay stress on the discovery in the Lakadong Cave of a most remarkable, quite blind, species of *Diestrammena*, the first blind cavernicolous Stenopelmatid known. It is, indeed, very curious to see that those insects which are so often taken as beautiful examples of adaptation to cavernicolous life present, as a rule, scarcely reduced organs of sight and that the blind species here referred to is absolutely isolated, no congeneric form showing any definite transition to it. Further the blind *Diestrammena* does not possess longer palpi, limbs or other appendages than other cavernicolous or even lucicolous species of the genus. It seems that the theory of modifications "compensatrices de l'impossibilité de voir" cannot be taken into consideration here. This is still more evident when we observe cavernicolous species of the nearly related genus *Raphidophora* which preserve in caves exactly the same stout form and relatively short appendages shown by all the species of the genus. The same parallel can be drawn between the European genera *Dolichopoda* Bol. and *Troglophilus* Krauss.

Finally we must point out that the blind *Diestrammena* has been taken in the same cave and very probably in the same place as another species of the same genus, very closely related to it, but with quite well-developed eyes (both species were mixed together in the same tube and

¹ See the first two series in *Mem. As. Soc. Bengal* V1 [1919] pp. 339-396, pl. xii-xiv and *Rec. Ind. Mus.* XXII [1921] pp. 511-527, pl. xxi-xxiii.

² It should be noted, however, that this species was found only at the entrance to the cave in broad daylight. [S.K.]

had been confounded by the collector). It seems that we must conclude from this either that two species of common origin have colonized the same cave at periods different enough to explain the fact that only one of them has become strongly modified, or preferably that one of the two forms has proved much more plastic than the other. This second interpretation seems more logical and, owing to the absence of intermediate phases, we are brought to the conclusion that the blind form may have originated from a common ancestor by sudden mutation rather than by slow modifications due to the influence of the surroundings.

ORTHOPTERA.

Family BLATTIDAE.

Subfamily CORYDIINAE.

Genus **Polyphaga**.

Polyphaga sp.

Hsin Dawng Cave, Elephant Hill, Yawng'hwe, S. Shan States, 13th March 1922 ; 1 immature ♂ under stone in complete darkness.

It is quite impossible to describe or recognize this species from this single male specimen in its last larval instar. It is at any rate the first species of the genus found in a cave and it must be quite well acclimatized there. When adult the species must be of a medium or rather small size, very likely to be ascribed to the *africana* group. The colour is rather pale, the eyes far distant from one another (the disposition may change at the last moult) ; the spines of the tibiae are moderately strong, regularly disposed ; intermediate tibiae with 7 superior spines (3+2+2) and 3 inferior (2+1) ; posterior tibiae with 10 superior (3+3+4) and 6 inferior spines (4+2).

Subfamily PANCHLORINAE.

Genus **Pycnoscelus** Scudder.

Pycnoscelus surinamensis L.

(Pl. IV, fig. 2.)

Siju Cave, Garo Hills, (S. Kemp and B. Chopra, Feb. 1922) ; 350-400 feet from entrance ; 16 ♀ and very numerous young individuals at all stages of development.

All these Blattids present a dark colouration and do not show the least difference from lucicolous specimens of the species. Among the 16 adult ♀, 2 only belong to the long-winged form, the other 14 having the elytra and wings extending scarcely to the apex of the abdomen. As usual, the ♂ seems to be very scarce ; in fact among the Siju Cave material, I have not been able to find a single ♂ although I have examined almost the whole material for that purpose.

Pycnoscelus striatus Kirby, which I have previously reported from Malay Caves, is very closely related to the present species ; but the ♂ is very easily distinguished, for in *P. striatus* the 8th sternite is square

and the 9th is exposed, longitudinally divided and united with the genitalia, whereas in *P. surinamensis*, the 8th sternite is rounded posteriorly, the 9th completely hidden and bearing one style. The ♀ is much more difficult to characterize, the general aspect being almost the same in both species ; the head is more exposed in *P. striatus*, the forehead more flattened and the eyes wider and more distant than in *P. surinamensis* ; the ocelli are also much bigger and more approximate to the eyes (figs. 1 and 2).

Family PHASGONURIDAE.

Subfamily RHAPHIDOPHORINAE.

Genus **Diestrammena** Brunner.

Diestrammena indica Chopard.

Hsin Dawng Cave, Elephant Hill, Yawngwe, S. Shan States, 13th March 1922 ; 2 immature ♀.

Nothing is to be added to the description I gave in these *Records* [1921, p. 519]. The species is still known from the immature female only.

Diestrammena brevifrons frieli, subsp. nov.

(Pl. IV, figs. 3-5.)

1921. *Diestrammena brevifrons*, Chopard, Rec. Ind. Mus. XXII, p. 518.

Types.—One male, one female from Lakadong Cave, Jaintia Hills (R. Friel, July 1921).

Very closely allied to typical *D. brevifrons* of which it has the same general shape and colour but from which it differs in the following characters :—

Almost completely glabrous ; frontal rostrum shorter, composed of two more widely separated tubercles (fig. 3) ; subgenital plate of ♀ not so regularly rounded posteriorly, nearly truncated (fig. 4) ; epiphallus of ♂ with almost straight sides and with less rounded angles (fig. 5). Legs longer ; intermediate tibiae with a very small spine on the internal inferior margin ; posterior tibiae armed with 35 to 40 spines, supero-internal apical spur equalling metatarsus.

Length of body 13 mm. ; ant. fem. 9 mm. ; ant. tib. 10.5 mm. ; interm. fem. 10 mm. ; interm. tib. 10.5 mm. ; post. fem. 20 mm. ; post. tib. 23 mm.

The *Diestrammena* I recorded (*l. c.*, p. 518) from Rupmath Cave belongs to this subspecies, the typical *brevifrons* being known only from Maosmai Cave.

Diestrammena caeca, sp. nov.

(Pl. IV, figs. 6-11.)

Types.—Two females from Lakadong Cave, Jaintia Hills (R. Friel, July 1921).

Size medium, colouration uniformly of a pale testaceous, without any trace of brown pigment ; almost wholly glabrous.

Head long and rather narrow ; occiput weakly convex, front declivous, frontal rostrum very short, composed of two rounded, widely

separated tubercles (fig. 8). Antennae yellow (broken off), their bases very approximate, a small tubercle between the sockets; facial shield smooth, glabrous; clypeus rather high, narrowing near the labrum; labrum elongate, ovoid. Mouth parts long, yellowish; galea and lacinia very long and straight, maxillary palpi wanting; labium elongate, labial palpi moderately long (fig. 9). Absolutely no trace of eyes and ocelli (figs. 6 and 7).

Pronotum rather wide, with anterior margin convex, weakly notched in the middle, posterior margin rather strongly convex, lateral lobes moderately high, their inferior margin convex, angles rounded; meso- and metanotum with posterior margin convex, lateral lobes with inferior border almost straight.

Abdomen oval; supra-anal valve triangular, subgenital plate trapezoidal, with posterior margin slightly sinuated (fig. 10). Cerci failing. Ovipositor broken at apex, rather short, gently curved from base; it seems quite smooth up to the apex.

Legs long and slender, pale yellow; anterior femora armed with 1 external movable spine and 1 internal very short one; tibiae with 2 apical spurs, 1 very small spine between the spurs, and 1 spine only on the inferior external margin. Intermediate femora armed with 2 long, movable, apical spurs; tibiae unarmed except the apical spurs. Posterior femora unarmed beneath but with a very small genicular spine inside; tibiae armed with 6 apical spurs, not very long but very slender, the supero-internal one shorter by one-fourth than the metatarsus (fig. 11); superior margins of tibiae armed with 18-20 very short and remote spines. Tarsi long and slender.

Length of body 13 mm.; pronot. 4 mm.; ant. fem. 11 mm.; ant. tib. 11.5 mm.; post. fem. 18.5 mm.; post. tib. 20 mm.; ovipositor 8 mm.

I can only refer the reader to what I said in the introduction about this most interesting species.

Genus **Tachycines** Adelung.

Tachycines adelungi Chopard.

(Pl. IV, figs. 12, 13.)

Hsin Dawng Cave, Elephant Hill, Yawngwhe, S. Shan States, 13th March 1922, 3♂, 1♀, a few young individuals of both sexes.

There is very little to add to the description I gave of this species (*Rec. Ind. Mus.* XXII, p. 520); the subgenital plate of the ♀ is triangular, slightly emarginate at apex (fig. 12); the ovipositor is rather short (10 mm.), as long as the cerci, scarcely curved, very acute at the apex, the inferior valves presenting 6 wide teeth (fig. 13).

Family GRYLLIDAE.

Subfamily *NEMOBIINAE*.

Genus **Speonemobius**, nov.

Allied to *Nemobius* Serv.; head big, rounded, legs relatively long; anterior tibiae with a large, oval, external foramen; posterior tibiae

armed with 3 external and 2 internal spines, and 5 apical spurs, 2 internal and 3 external. Elytra of ♂ as in *Nemobius*; ♀ unknown.

Genotype : *Speonemobius decoloratus*, sp. nov.

Speonemobius decoloratus, sp. nov.

(Pl. IV, figs. 14–17.)

Type.—One male from Siju Cave, Garo Hills (S. Kemp and B. Chopra Feb. 1922); at entrance.

Size and general aspect of a *Nemobius* (fig. 14). Head relatively big, whitish; front with 4 rows of bristles, 2 of which extend between the antennae; face adorned with two narrow indistinct, brown stripes and a brown spot beneath each eye. Mouth parts yellowish; palpi wholly white, the last joint of the maxillary palpi showing only a small greyish stripe inferiorly, 4th joint shorter than 3rd, 5th large, triangular (fig. 15). Antennae pale testaceous, with a certain number of brown narrow rings. Eyes moderately large, brown; ocelli very small.

Pronotum longer than wide, with anterior margin almost straight, provided with long bristles, posterior margin scarcely sinuated; lateral lobes not very high, their inferior border strongly sinuated, angles rounded; general colour whitish with 2 pyriform, brownish spots on the disk and posterior margin of lateral lobes blackish; disk with long, scarce, bristles.

Abdomen pale testaceous, with sides brownish, very pubescent, supra-anal valve large, lengthened, rounded at apex; subgenital plate short, blackish. Cerci testaceous.

Legs relatively long, mostly whitish, anterior coxae bearing a few long black bristles; anterior femora compressed, slightly greyish at apex, presenting a few bristles on their inferior margins and near the apex of the internal side; tibiae light greyish, darkened at apex, armed with 2 apical spurs, the internal longer than the external one, and bearing a large oval foramen at the external face; tarsi long, base of metatarsus, 2nd joint and apex of 3rd joint blackish. Intermediate legs similar to anterior ones. Posterior femora moderately dilated, light testaceous with a few short brown stripes on external face; tibiae greyish, darkened at apex and at base of each spine, armed with 5 spines and 5 apical spurs; the spines are whitish, 2 internal and 3 external ones, the latter of moderate length, subequal, the former long and slender, inserted between the 2nd and 3rd external and between that one and the apex; 3 external spurs, the inferior very tiny and short, the other 2 rather short but the intermediate longer than the superior one (fig. 16); the 2 internal spurs are long, gently curved, whitish, the superior somewhat the longer (fig. 17); tarsi long, pale testaceous, with apex of metatarsus, 2nd joint and apex of 3rd joint blackish, metatarsus very long, armed with 2 apical spurs.

Elytra (fig. 14) a little shorter than abdomen, rounded at apex, with a blackish ground colour, the whitish veins and posterior margin standing out in relief on the back-ground; discoidal vein somewhat distant from the humeral, to which it is united by a few veinlets; anal vein broken at right angle, diagonal vein rather short, straight; cords

regularly distant, curved, the internal one united to the speculum by a veinlet; speculum rather large, divided into a very large internal cell and 2 small external ones; apical area very short, formed of a few indistinct cells; lateral field black except the whitish humeral band with 3 plain, parallel nerves besides the mediastinal one.

Length of body 9 mm.; pronot. 1·6 mm.; elytra 5 mm.; ant. fem 3 mm.; post. fem. 7·5 mm.; post. tibiae 6 mm.

Although found at the entrance of the cave, this species is remarkably decolourized; the very peculiar armature of the posterior tibiae makes it necessary to create a new genus for it.

Subfamily *PHALANGOPSINAE*.

Genus *Larandopsis*, nov.

General shape and aspect of a Phalangopsine of the group *Laranda* Walk., but both sexes with elytra and wings developed; pronotum with lateral lobes subtriangular; anterior tibiae with a foramen on their internal face; posterior femora rather short with no apical filiform part; posterior tibiae presenting very small denticles in their basal part and between the spines which are 4 in number on each margin; 6 apical spurs, the external ones very short, the supero-internal longer than the other two.

Genotype: *Larandopsis choprai*, sp. nov.

This genus is closely allied to the different genera of Phalangopsinae with short femora, but it seems to be the only one with elytra and wings developed in both sexes. Unfortunately the types of the species are immature, so that important features, such as the venation of the elytra, are completely unknown. Yet the development of these organs is quite sufficient to assert positively that they exist in the adult ♀ as well as in the ♂.

Larandopsis choprai, sp. nov.

(Pl. IV, figs. 18–21.)

Types.—One young ♂, one young ♀ from the Siju Cave, Garo Hills (S. Kemp and B. Chopra, February 1922), at entrance. 2 other young ♂ at entrance and at 500 feet from entrance.

Size medium (?); colouration rufous testaceous varied with brown. Head a little narrower than pronotum; occiput moderately convex, adorned with 4 narrow brown lines, 1 behind each eye, and 2 near the middle, widening forward up to the base of frontal rostrum; this is about as wide as the first antennal joint, rather elongate, its margins parallel (fig. 18). Eyes rounded, somewhat prominent, ocelli very small, rounded, whitish, anterior one at apex of the rostrum, on its anterior face, posterior ones at base of it. Face declivous, yellowish, with a median brownish band on the top of facial shield, divided in its inferior part, and joining on each side with band of same colour below each eye. Maxillary palpi yellow, somewhat brownish outside, with 5th joint very long. Antennae brown, long.

Pronotum wide, somewhat convex above, anterior margin slightly notched, fringed with bristles, posterior margin straight, disk brownish

with an irregular median whitish band and a large, more or less rounded, yellowish spot on each side (fig. 18); lateral lobes almost triangular (fig. 19), fuscous with a small yellow spot.

Elytra and wings present in both sexes.

Abdomen covered above with a golden pubescence, yellowish in the middle, brownish laterally; supra-anal valve elongate, subtriangular. Cerci very long, as long as the body.

Legs rather long, yellowish with brown bands; anterior femora showing the trace of a foramen inside; anterior and intermediate tibiae with 3 brown rings, armed at apex with 2 small inferior spurs. Posterior femora rather stout and short, gently narrowed apically, showing a few brown spots on the external face; posterior tibiae with 2 basal brown spots, armed with 4 pairs of spines, moderately long, the internal longer than the external ones; a few very small denticles in the basal part of the tibiae and between the spines on the external margin only ($3+1+1$); external spurs very short, the intermediate about twice as long as the other two (fig. 20), infero-internal spur rather short, the intermediate and superior ones very long, straight, hairy, the superior as long as the metatarsus (fig. 21), metatarsus armed with 2 apical spurs and a few denticles (4 or 5) on the external margin only.

Length of body 10 mm.; cerci 10 mm.; post. fem. 9.5 mm.; post. tibiae 9 mm.

Although we should avoid describing new species from immature specimens, especially when dealing with winged species, I consider that the characters offered by the insect here described are quite sufficient to recognize it in future when the description can be completed by the indication of some features which are wanting, such as the venation of the elytra in the ♂ and the shape of the ovipositor in the ♀.

Genus **Kempiella**¹ nov.

Very closely allied to *Arachnomimus* Sauss., the posterior tibiae having, as in that genus, the supero-internal spur shorter than the intermediate, but elytra present in ♂, short and with very abnormal venation: speculum incompletely closed posteriorly, one cord only well marked united to the internal side of the speculum by 4 veinlets.

Genotype: *Kempiella longipes*, sp. nov.

Kempiella longipes, sp. nov.

(Pl. V, figs. 22-34.)

1921. *Arachnomimus* sp., Chopard, Rec. Ind. Mus. XXI, p. 523.

Types.—One male, one female, from Siju Cave, Garo Hills (S. Kemp and B. Chopra, Feb. 1922); 1,600 to 2,000 feet from entrance.

Cotypes.—Same locality: 200 feet from entrance, 2 young ♂, 3 young ♀; 400 feet from entrance, 2 young ♀, 1 young ♂; 450-500 feet from entrance, 2 young ♂, 1 adult ♀, 2 young ♀; 1,200 feet from entrance, 1 ♂, 1 very young ♂, 1 very young ♀ under stone; 1,600 to 2,900 feet

¹ I take much pleasure in naming this new genus in honour of Dr. S. Kemp to whom is due its discovery.

from entrance, 1 ♂, 4 ♀, 3 young ♂, 3 young ♀; 3,000 to 3,600 feet from entrance, 1 adult ♀, 1 young ♂, 2 young ♀.

Male (fig. 22). Size medium, colour testaceous marked with dark brown. Head small, testaceous; occiput and forehead slightly convex, covered with black hairs; frontal rostrum somewhat wider than first joint of antennae, rounded at apex; face yellowish, glabrous, shining; cheeks darkened; facial shield ending in a wide process between the antennae, with a short brown line on each side. Mouth parts whitish, short; maxillary palpi (fig. 23) very long, the 1st and 2nd joints short, white, the three last ones very long and slender, brownish, 5th scarcely widened at apex; labial palpi rather short, whitish. Antennae long, brown. Eyes small, narrow, ocelli absent.

Pronotum much wider than long, its anterior and posterior borders straight, lateral lobes much diverging from the body, with inferior margin rather strongly oblique backwards (fig. 32), anterior angle somewhat rounded; anterior and posterior borders with a row of bristles, surface covered with a fine golden pubescence with long blackish hairs, chiefly near the middle; disk almost flat, with a median furrow and two rounded elevations in the anterior part; colour yellowish above, fuscous laterally. Mesonotum whitish with posterior border thickened and sinuated, presenting 2 rounded tubercles near the middle; metanotum much like the mesonotum but with tubercles and ridge more accentuated and colour more testaceous.

Abdomen yellow with sides and apical margin of the tergites brownish, covered with a golden pubescence, rather strongly narrowed posteriorly; 10th tergite presenting 2 long rounded processes (fig. 24); subgenital plate rather long, subtruncated at apex, with 2 small blackish spots near the base. Cerci extremely long and slender, much longer than the body.

Genitalia (fig. 25) composed of membranous valves and a strongly chitinized pseudopiphallus, subtriangular, formed of a superior part, divided into 3 acute processes, and an inferior bifid part.

Legs long and slender, testaceous, the apex of femora darkened. Anterior tibiae with a small oval tympanum near the base, inside (fig. 26), their apex armed with 2 rather long, inferior spurs; tarsi very long, chiefly the metatarsus, which is almost cylindrical, armed with spinules beneath (fig. 27). Intermediate legs similar to anterior ones. Posterior femora very abruptly narrowed near the middle, unarmed; posterior tibiae very long, armed with 6 apical spurs and 4 spines on each superior margin; these spines are inserted in the second half of the tibia, the external somewhat above the internal ones; there are a few very small denticles between the spines; external apical spurs much shorter than the internal ones, the inferior very short, the 2 superior long and subequal (fig. 28); infero-internal spur short, the 2 supero-internal much longer, chiefly the intermediate one (fig. 29). Tarsi long, the metatarsus much longer than the other two articles, armed above with a few very small denticles and with 2 rather strong apical spurs, the internal of which is longer than the external (fig. 30).

Elytra extending to the apex of the second abdominal tergite, blackish, with the anal field and a band along the external margin testaceous,

lateral field rather high, blackish. Neurulation very abnormal (fig. 31 and 32) : mediastinal vein with numerous parallel, almost straight and indistinct branches ; discoidal vein much distant from the median ; diagonal vein very short ; speculum large, triangular, with a few posterior, more or less incompletely completed areas, mixing themselves with the short apical field ; 3 oblique veins ; cords quite indistinct except the 1st one which is united to the mirror by 4 transverse veinlets. Left elytron translucid, with the same venation.

Female. General shape and colour as in male, but apterous ; meso- and metanotum without tubercles and with posterior margin straight, wholly blackish ; 1st abdominal tergite blackish with a white band along the posterior margin. 2nd and 3rd tergites yellowish laterally, the rest more or less completely brownish ; 10th tergite plain, supra-anal valve rounded ; subgenital plate rather elongate, slightly notched at apex. Ovipositor long, very feebly curved upwards (fig. 33), apical valves very little dilated, their margins smooth, the superior ones finely striated (fig. 34).

Length of body 10·5–12·5 mm. ; pronot. 2·5 mm. ; width of pronot. 4 mm. ; ant. fem. 9–10 mm. ; ant. tib. 9–10 mm. ; interm. fem. 8·5–9·5 mm. ; interm. tib. 8·5–9·5 mm. ; post. fem. 14 mm. ; post. tib. 16 mm. ; cerci 17 mm. ; ovipos. 9·5 mm. ; antennae about 50 mm.

This interesting species shows very constant characters, both in individuals found near the entrance of the cave and in those which have been taken at a great distance from the entrance ; the eyes are as well developed in the latter as in the former. Young individuals do not show any special character ; they never present the least trace of wings. In the ♂ the elytra begin to develop rather late and, in the last stage, they are rounded, slightly overlapping, black ; in young ♂, up to the last moult, the meso- and metanotum are plain and the 10th tergite presents only small tubercles in place of the prominent processes of the adult.

DERMAPTERA.

As stated in my previous report (*Rec. Ind. Mus.* XXI, p. 511), the species of this group which live in caves do not present very conspicuous characters of adaptation to cavernicolous life. But as most of them live in obscurity and are usually hygrophilous insects, they find in caves conditions very favourable for their mode of life and some of them are completely adapted to this special habitat.

Family FORFICULIDAE.

Subfamily LABIDURINAE.

Genus **Forcipula** Bolivar.

Forcipula trispinosa Dohrn.

Bank of Someswari River, near mouth of Siju Cave : 2 ♂, 2 ♀.

This species is not to be included in the list of cavernicolous Dermaptera, as it has never been found inside caves, the specimens I formerly reported (*l. c.*, p. 511) from the Siju Cave belonging to the subsequent species.

Forcipula borellii,¹ sp. nov.

(Pl. V, figs. 35–41.)

1921. *Forcipula trispinosa*, Chopard, Rec. Ind. Mus. XXI, p. 511.

Types.—One male, one female, from the Siju Cave, Garo Hills (S. Kemp and B. Chopra, Feb. 1922); 400 to 450 feet from entrance.

Cotypes.—Same locality, 300 to 500 feet from entrance, 5 ♂, 9 ♀, 10 young individuals at different stages of development.

Male (fig. 35). Rather slender, fuscous, legs light yellow, all the femora with a wide brown ring. Pubescence short but abundant on all parts of the body, appendages and elytra. Head depressed, almost quadrangular, occiput and forehead fuscous with a small yellowish spot near each eye; clypeus yellowish; labrum fuscous; palpi yellowish with last joint brown. Antennae dark brown, composed of 31 joints, 2nd very small, 3rd long, 4th shorter than 5th, the following ones becoming long and slender (fig. 36).

Pronotum somewhat longer than wide, deeply impressed in the middle, its anterior part smooth, posterior part feebly shagreened, lateral margins a little raised, yellowish, disk fuscous.

Abdomen rufous brown, very finely punctuated, covered with a short, golden pubescence, each tergite showing a few long bristles along the posterior margin, and two smooth, glabrous, longitudinal stripes on each side; 4th to 8th tergites with a row of very minute tubercles along the posterior margin, 3rd to 5th with a lateral spine, rather stout on the 3rd, long and stout on the 4th and 5th, 6th tergite with a lateral tubercle (figs. 35 and 37); 10th tergite almost smooth, shining, somewhat depressed in the middle, presenting two oblique and very obtuse keels ending in a tubercle. Superior face of the body covered with an abundant, rather long, golden pubescence, subgenital plate subangular. Forceps (figs. 38 and 39) presenting a basal dentiform keel, inner side of the branches minutely spinose, chiefly in the apical third, bearing near the anterior third a strong tooth directed backwards and a short tuberculiform one at a little distance. Pygidium large, triangular, rounded at apex.

Legs yellowish, rather long and slender; front femora swollen, very little darkened inside, intermediate and posterior ones with a wide brownish ring after the middle; tibiae darkened at base; tarsi pale yellow with 1st article a little longer than 3rd.

Elytra fuscous, pubescent, somewhat widened near the apex; keel present at shoulder only, apical margin straight. Wings concealed by the elytra, but attaining, however, half the length of the 1st abdominal tergite, the reduction bearing much more on the posterior part than on the anterior; the latter is as developed as the former which is considerably reduced, thin and with scarcely perceptible veins (fig. 40).

Female. General shape as in ♂, but without lateral spines on the abdomen, 10th tergite very little narrowed posteriorly, furrowed in the middle, with posterior margin straight and presenting 2 small tubercles

¹ Named in honour of Dr. A. Borelli, of Turin, who has had the kindness to examine specimens of this species and to point out the differences between it and the small forms of *F. trispinosa*.

Forceps long, stout, the branches triangular at base, denticulate at the inner side, and presenting a rather long tooth near the apical fourth, curved at apex (fig. 41).

Length of body, ♂ 17 mm., ♀ 18 mm.; pronot. 2·2 mm.; elytra 3 mm.; wings 2 mm.; forceps, ♂ 8 mm., ♀ 5 mm.

Individual Variations. The size is rather variable, from 15·5 to 18 mm.; in the male, the forceps vary from 6·5 to 9 mm. in length, but always preserve the same general shape and denticulation; the spines of the abdomen are rather inconstant, especially the 1st and 4th, the latter being almost always reduced to a tubercle as in the typical specimen, whereas sometimes both of them are almost completely absent.

In some respects this species shows much affinity with *F. trispinosa* and its var. *minor* Burr; it is about the same size and has the short wings of the latter, but the forceps are quite different, more like those of typical *trispinosa*, although showing important differences, such as the presence of a basal crest and of a second internal spine.

Subfamily *CHELISOCHINAE*.

Genus **Chelisoches** Scudder.

Chelisoches morio F.

Siju Cave, Garo Hills (S. Kemp and B. Chopra, Feb. 1922); 400 to 500 feet from entrance, 3 ♂, 4 ♀; at entrance 1 ♀.

A very common species already reported from different caves in India. The cavernicolous specimens are absolutely similar to the lucicolous ones.

Subfamily *FORFICULINAE*.

Genus **Timomenus**, Burr.

Timomenus lugens Bormans.

Siju Cave, Garo Hills (S. Kemp and B. Chopra); at entrance, 1 ♂.

A lucicolous species, not uncommon in India, which had never before been reported from caves.

APPENDIX.

Some of the descriptions I gave in my previous papers on Indian cavernicolous Orthoptera require the following rectifications:—

Phyllodromia nigrocincta Chop., *Mem. As. Soc. Beng.* VI [1919], p. 343. This species is an *Ischnoptera* as is clearly shown by the drawing I gave of the venation of the wing (*l. c.*, fig. ii); it seems rather closely allied to *I. cavernicola* Shelf.

Thanks to Dr. R. Hanitsch, I have had the opportunity to study two female specimens of *Ischnoptera cavernicola* Shelf from Jibong Cave (Sarawak). This species is much nearer to my *I. nigrocincta* than I had thought; the general colour and shape is almost exactly the same but it can be readily distinguished by the shape of supra-anal and subgenital plates, as follows:

Supra-anal plate regularly rounded at apex, subgenital plate short, with posterior margin weakly convex and presenting two small lateral lobes near the base *I. cavernicola* Shelf.

Supra-anal plate slightly notched in the middle of posterior margin ; subgenital plate somewhat elongate with posterior margin sub truncate *I. nigrocincta* Chop.

Spelaeoblatta (?) caeca Chop., *Rec. Ind. Mus.* XXII [1921], p. 512. After a careful examination of the characters shown by this remarkable Blattid, it seems evident that it cannot enter the genus *Spelaeoblatta* and even that it does not belong to the subfamily Blattinae. Its general shape and, above all, the armature of the anterior femora recalls much more the Pseudomopinae (Phyllodrominae). It must be considered as a new genus of this subfamily, for which I propose the name *Typhloblatta*. This genus may be characterized as follows :—

Apterous, blind. Antennae very long, with 3rd joint much longer than 2nd. Cerci long and slender. Anterior femora armed with a few basal spines, followed by a series of spiniform bristles. No tarsal arolia.

Genotype: *Typhloblatta caeca* Chop.